

Questions and Answers About Thyroid Cancer

1. What is the thyroid and what is its function?

The thyroid is a butterfly-shaped gland located in the neck, below the Adam's apple. It makes and stores hormones that regulate heart rate, blood pressure, body temperature, and the rate at which food is converted into energy (metabolism), and affects the nervous system, muscles, and other organs. Hormones made by the thyroid are also important during childhood growth and development. The thyroid uses iodine, a mineral found in iodized salt and in some foods, to make several of its hormones.

2. What is thyroid cancer?

Thyroid cancer is a disease in which thyroid cells become abnormal, grow out of control, and form a cancerous tumor. If left untreated, thyroid cancer can spread to other parts of the body through a process called metastasis.

3. How common is thyroid cancer?

In 1997 an estimated 16,100 people in the United States will be diagnosed with thyroid cancer. This disease, which is the most common cancer of the endocrine system, accounts for about 1 percent of all cancers. However, 90 percent of all thyroid nodules (lumps) are not cancerous.

The risk of developing thyroid cancer increases with age. Most thyroid cancers occur in people 50 years old and older, but this disease can occur in people of all ages, including teenagers and young adults.

4. What are the different types of thyroid cancer?

There are four major types of thyroid cancer: papillary, follicular, medullary, and anaplastic. The different types of thyroid cancer look different under a microscope and generally grow at different rates.

- **Papillary cancer.** This type of thyroid cancer develops in cells that produce thyroid hormones containing iodine. Papillary cancer is well-differentiated, meaning that it grows very slowly and contains cells that are similar to healthy thyroid cells. Doctors usually can treat these cancers successfully, even when cancer cells have spread to nearby lymph nodes. Papillary cancers account for about 60 to 80 percent of all thyroid cancers.
- **Follicular cancer.** This type of cancer also develops in thyroid cells that produce iodine-containing hormones. Many follicular cancers can be cured. While these cancers are also well-differentiated, the disease can be difficult to control if the cancer invades blood vessels or grows into nearby structures in the neck. About 10 to 30 percent of thyroid cancers are follicular cancers.
- **Medullary cancer.** Medullary cancer is more difficult to control than papillary and follicular thyroid cancers because the cancer cells tend to spread to other parts of the body. The cells involved in medullary cancers produce calcitonin, a hormone that does not contain iodine. About 5 to 7 percent of all thyroid cancers are medullary cancers.

Of the four types of thyroid cancer, only medullary thyroid cancer has a clear genetic predisposition that can be passed on in families. This predisposition is due to an alteration of the RET gene. Individuals who inherit this alteration are almost certain to develop medullary thyroid cancer at some time in their lives. About 7 percent of all medullary tumors are believed to be related to this genetic alteration.

- **Anaplastic cancer.** Anaplastic cancer, which is poorly differentiated, is the fastest growing type of thyroid cancer. The cancer cells are extremely abnormal and spread rapidly to other parts of the body. Anaplastic cancers make up only about 2 percent of all thyroid cancers.

5. What causes thyroid cancer?

Doctors do not know what causes most cases of thyroid cancer. However, scientists have observed that thyroid cancer affects women two to three times as often as men and occurs more frequently in whites than in blacks. Scientists do not fully understand the reasons for these patterns; they continue to study thyroid cancer to try to learn what factors may increase a person's risk for this disease.

One known risk factor for papillary and follicular thyroid cancer is exposure to x-ray therapy (also called external beam radiation) during childhood. Before doctors knew of its dangers, radiation was used to treat acne and to reduce swelling and infection in organs such as the thymus, tonsils, adenoids, and lymph nodes. People who received radiation to the head and neck during their childhood have a higher-than-average risk of developing

thyroid cancer many years later. Scientists are doing studies to determine whether other types of radiation exposure can cause thyroid cancer.

Testing of nuclear weapons at the Nevada Test Site during the 1950s resulted in the release into the atmosphere of large amounts of radioactive products, including radioactive iodine (mainly I-131). Everyone living in the contiguous 48 states was exposed to I-131 at some level. I-131 collects in the thyroid, but scientists do not know to what extent this exposure in the 1950s is linked to the development of thyroid cancer. Individuals who are concerned about cancer risk from fallout exposure are encouraged to request a thyroid examination when they visit their doctor and to discuss their concerns with their doctor.

6. What should people who may be at increased risk for thyroid cancer do?

The National Cancer Institute recommends that anyone who received radiation to the head or neck in childhood be examined by a doctor every 1 to 2 years. The most important part of a checkup is the careful examination of the neck, feeling for lumps in the thyroid and enlargement of nearby lymph nodes. A thyroid scan (scintigram) or ultrasonography may be recommended for people at risk for thyroid cancer. Doctors may also show patients how to do a routine self-exam of the thyroid.

Also, people who have a family member with medullary thyroid cancer may have inherited an alteration in the RET gene, which could lead to the development of this disease. Family members can be tested for the RET gene.

7. What are common symptoms of thyroid cancer?

The most common symptom of thyroid cancer is a lump, or nodule, that can be felt in the neck. Other symptoms are rare. Pain is seldom an early warning sign of thyroid cancer. However, a few patients have a tight or full feeling in the neck, difficulty breathing or swallowing, hoarseness, or swollen lymph nodes. These symptoms can be caused by thyroid cancer or by other, less serious problems. Only a doctor can determine the cause of a person's symptoms.

8. How can a doctor diagnose thyroid cancer?

The doctor may use several tests to learn the size and location of a thyroid nodule and/or to help determine whether a lump is benign (not cancerous) or malignant (cancerous). For example, the doctor may order blood tests to check how well the patient's thyroid is functioning. Ultrasonography is a technique that produces a picture of the thyroid. In this procedure, high-frequency sound waves, which cannot be heard by humans, pass into the thyroid. The patterns of echoes produced by these waves are converted into a picture (sonogram) by a computer. Doctors can tell whether nodules are fluid-filled cysts, which are usually benign, or solid lumps that might be malignant. Also, a radioactive iodine scan can outline abnormal areas of the thyroid. Before the scan, the patient is given a very small amount of a radioactive substance, usually technetium (Tc-99m), which collects in the

thyroid. An instrument called a scanner can detect areas in the thyroid that do not absorb iodine normally. Because such “cold spots” can be either benign or malignant, further tests are necessary.

The only sure way to tell whether a patient has thyroid cancer is to look at cells from the thyroid with a microscope. There are two ways to obtain a sample of thyroid tissue: by withdrawing cells using a needle (needle biopsy) or by surgically removing the nodule (surgical biopsy). In either case, a pathologist examines the tissue under a microscope to look for cancer cells.

If the needle biopsy does not show cancer, the doctor may give the patient thyroid hormones. These hormones make it unnecessary for the thyroid to produce its own hormones, and the gland, including the nodule, shrinks and becomes inactive. If the needle biopsy is not conclusive or if the thyroid hormones are not effective, the patient usually has a surgical biopsy.

When thyroid cancer is diagnosed, doctors may do more tests to learn about the stage (extent) of the disease. The results of these tests help doctors plan appropriate treatment.

9. How is thyroid cancer treated?

Treatment for thyroid cancer depends on the type and stage of disease, as well as the age and overall health of the patient.

Surgery is the most common form of treatment for thyroid cancer that has not spread to distant parts of the body. The surgeon usually removes part or all of the thyroid and any other affected tissue, such as lymph nodes. (If the patient has a surgical biopsy, the biopsy and the removal of the thyroid may be done in the same operation.) After surgery, patients may be treated with I-131. The patient swallows the iodine, which collects in any thyroid cancer cells that remain in the body after surgery. By damaging such cancer cells, the radioactive iodine helps prevent the disease from recurring. The patient might be required to remain in the hospital for a few days while the radiation is most active. The treatment may be repeated at a later time.

Hormones are usually given to patients who have had surgery to remove the thyroid and/or treatment with radioactive iodine. The hormones replace those that are normally produced by the thyroid. This treatment also slows down the growth of any remaining thyroid cancer cells. The doctor may need to do followup tests to determine whether the patient is getting the proper amount of the needed hormones.

If the thyroid cancer has spread to other parts of the body, treatment usually includes some form of systemic therapy (treatment that can kill or slow the growth of thyroid cancer cells throughout the body), such as chemotherapy, radioactive iodine therapy, and/or hormone therapy.

10. Is followup treatment necessary? What does it involve?

Regular followup is very important after treatment for thyroid cancer. Followup care may include periodic complete physical exams, x-rays, scans, and blood tests.

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Sources of National Cancer Institute Information

Cancer Information Service

Toll-free: 1-800-4-CANCER (1-800-422-6237)

TTY (for deaf and hard of hearing callers): 1-800-332-8615

NCI Online

Internet

Use <http://www.cancer.gov> to reach NCI's Web site.

CancerMail Service

To obtain a contents list, send e-mail to cancermail@icicc.nci.nih.gov with the word "help" in the body of the message.

CancerFax® fax on demand service

Dial 301-402-5874 and listen to recorded instructions.

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